**3GPP TSG-RAN** **WG2 Meeting #118-e R2-200xxxx**

**Electronic, 9 – 20 May 2022**

**Agenda Item: 5.1.4.1.1**

**Source: Huawei, HiSilicon**

**Title: Summary of [AT118-e][015][NR1516] p-MaxEutra and p-NR-FR1 (Huawei)**

**Document for: Discussion and decision**

# Introduction

This document summarizes the following offline discussion for Rel-15 UE capability corrections.

[AT118-e][015][NR1516] p-MaxEutra and p-NR-FR1 (Huawei)

Scope: Treat R2-2204411, R2-2204648, R2-2204453, R2-2205404, R2-2205513, R2-2204649

Ph1 Determine agreeable parts, Ph2 approve reply LS (offline, CB online only if necessary).

Intended outcome: Report, Approved LS out

Deadline: Schedule 1

# Contact from companies

|  |  |
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# Discussion

## Background: LSs from other groups

In [1] RAN5 askes RAN1, RAN2 and RAN4 on whether the specifications require that the IEs p-MaxEUTRA and p-NR-FR1 are always configured by the network when UE works in EN-DC connectivity mode.

In [2] RAN1 replied the below

*There is no specified UE behavior in existing RAN1 specifications for the case where FR1-FR1 EN-DC is configured but p-MaxEUTRA or p-NR-FR1 is not configured. RAN1 may discuss potential action, if any, after RAN2/4 responses are received.*

In [3] RAN4 replied the below:

*For UEs supporting dynamic power sharing, RAN4 understanding is there is no specified UE behavior when the network does not configure p-MaxEUTRA or p-NR-FR1. It is up to RAN1 to confirm if this is a valid configuration. RAN4 will further discuss whether ‘infinity’ could be used as default value if these two parameters are not configured, and whether and how to capture this in the specification.*

*For UEs not supporting dynamic power sharing, RAN4 understanding is the UE’s transmitted power is not fully specified by RAN4. It is up to RAN1 to decide if p-MaxEUTRA or p-NR-FR1 should be configured by the network or if default values are needed.*

## Discussion: draft LS reply from RAN2

In [4] the LS contact proposed a draft reply as below, as according to the replies from RAN1 and RAN4, there seems no clear clue on whether there is any default value to be defined, or there is a mandated requirement to always configure both.

*RAN2 would like to confirm that RAN2 specifications don’t require that p-MaxEUTRA and p-NR-FR1 are always configured by the network when UE works in EN-DC connectivity mode. There is also no default value specified for these two IEs in case these two IEs are not configured. In case RAN1/4 agreed additional requirements for these two IEs, RAN2 can update RAN2 specifications accordingly.*

In [6] the LS draft reply is as below, the first part is similar as [4] and the major difference is to require the network to always configure both fields in real deployment, and indicate this to RAN5. The detailed reasoning is described in [5].

*According to RAN2 specification TS 36.331 and TS 38.331, there is no restriction that requires the network to always provide p-MaxEUTRA and p-NR-FR1 IEs to EN-DC UEs, and RAN2 specification does not specify the default value and expected UE behaviour if the field is not provided.*

*However, from RAN2 perspective, in real deployment, the network always configure p-MaxEUTRA and p-NR-FR1 fields when the UE is configured with EN-DC, because those parameters are used to determine the power split between MCG and SCG, and whether semi-statistic or dynamic power sharing mechanism is configured by network. So RAN2 sees no need to specify default values for these fields, and no need to discuss and specify UE behaviour for the scenario where p-MaxEUTRA and p-NR-FR1 are not configured.*

**Q1-1 Do companies agree that in real deployment the network always configure p-MaxEUTRA and p-NR-FR1, and agree to indicate this to RAN5?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| OPPO | Yes |  |
| vivo | Not sure |  |
| Nokia | No | Those are optional IEs and the network is not required to configure them. Although it seems in RAN1 specifications there is no explicit behavior but in RAN4 specifications there is an understanding that if p-MaxEUTRA or p-NR FR1 are not present the UE’s power class capability applies. |
| ZTE | Yes | We have added more explanation extracted from [5] to above paragraph.  We understand those are optional IEs that literally is allowed to not provide. But for EN-DC UEs, these IEs are used for UE to determine the power split between MCG and SCG, and whether semi-statistic or dynamic power sharing is configured. So the function does not work if these IEs are not provided.  We understand companies may think that RAN1/4 can discuss and specify rules for the case when the fields are not provided. However, this is Rel-15 discussion, even if RAN1/4 specify new rules, they are not applicable to existing R15/16 UEs, and most likely, we have to introduce UE capability so the network can differentiate them and take different actions.  So from network perspective, we don’t much difficulty to provide the two fields, and we haven’t seen the benefit of defining default behaviour or new rules for this (maybe company can clarify the benefit, if any).  It is better to focus on essential corrections in R15, instead of fixing a hole that can easily be avoided by network implementation. ; ) |
| CATT | Yes | We tend to agree with ZTE analysis. It would be nice if we could confirm this in R2 and inform R1/4 so that they can save their time. |
| Qualcomm Incorporated | Not sure | There are multiple configurations for TX power limitation and the general principle (where it is clearly defined in RAN2 specifications) is that the UE simply does not apply the power limitation. |
| Ericsson | Yes | We agree with the analysis from ZTE. |
| Apple | Yes | Agree with ZTE |
| SoftBank | Yes | Agree with ZTE. Even though both IEs are optional and can be absent, network needs to provide them for indicating the EN-DC power control mode (dynamic or semi-static).  We think it is a corner case where FR1-FR1 EN-DC is configured but p-MaxEUTRA or p-NR-FR1 is not configured. So, it is helpful for RAN1/4 that it is not a practical scenario from RAN2 point of view. |
| Huawei, HiSilicon | Not sure | We understand that the reasonable configuration is as ZTE analysed, but we are not sure whether we need to mandate such configuration. If the network does not configure the parameters, the UE can use its supported power class or other configuration in our understanding. |
| MediaTek | Not sure | The current R1/R4 reply is also not clear but we tend to agree with ZTE. It would be simpler to just always provide the configuration. |
| Samsung | Yes | Agree with ZTE |

**Q1-2 Do companies have any preference on [4] or [6], and any suggestions to the LS wording?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Preference on [4] or [6]?** | **Wording suggestions** |
| OPPO | [6] | **Since [4] seems to promote the further discussion on the case where the parameter is absent.** |
| vivo | [4] | Power control scheme is defined in RAN1 specs, so it would better to let RAN1 to confirm whether these two IEs shall be mandatorily configured. |
| Nokia | [4] | [4] reflects the situation correctly from RAN2 perspective so it should be used as baseline. |
| ZTE | [6] | See our comments to Q1-1. |
| CATT | [6] |  |
| Qualcomm Incorporated | [4] | As other TX limitation configurations, the expected behaviour in case of absence should come from RAN1 and RAN4. |
| Ericsson | [6] | We think it is good to point out in the LS reply to the other groups that even if the fields are technically optional, in practice the network always signals these for EN-DC. Hopefully this can resolve the current deadlock. |
| Apple | [6] | But we are ok to inform RAN4 as well about this. |
| SoftBank | [6] | It would be better to indicate no specification change is required in reply LS. It is up to RAN1/4 whether further discussion is needed. |
| Huawei, HiSilicon | [4]\* | But we see some logic from [6], perhaps we can add one more sentence that “in practice it is expected that the network will configure p-MaxEUTRA and p-NR-FR1 fields when the UE is configured with EN-DC”. Whether RAN1/RAN4 wants to define anything else is up to other WGs, we feel it is a bit beyond RAN2’s perspective. |
| MediaTek | [4]\* | Same view as Huawei. [4] is correct from RAN2 perspective. We however have sympathy on ZTE’s view. So, adding the new sentence proposed by Huawei make it a good compromise. |
| Samsung | [6] | We prefer to share the RAN2 understanding that the practice the network always signal these fields. |

According to the above discussion, there seems no controversial views that the LS should reflect the situation of what RAN2 specification allows, i.e. the RAN2 specifications do not mandate always configuring these two parameters as these fields are optional. On the other hand there is also a number of companies suggesting to mention that in practical deployment, the network should always configure the relevant parameters; while some other companies are not sure whether other parameters configured could apply if the network does not configure the mentioned parameters.

The rapporteur think that the RAN1/RAN4 reply is not super clear, as this is for Rel-15 and to avoid lengthy discussion involving multiple WGs, it makes sense to clarify in the RAN2 LS that suitable network configuration can avoid this potential ambiguity as suggested in [5][6]. However it may be a bit too much to state more other than this suitable network configuration as proposed in [6]. As long as RAN1/RAN4/RAN5 receives the reply from RAN2, they can decide not to discuss this anymore by taking into account what RAN2 indicates.

So in summary it is proposed as follows:

**Proposal 1: to revise R2-2205513 adding the statement that “However, from RAN2 perspective, in practical deployment, it is expected that the network will configure p-MaxEUTRA and p-NR-FR1 fields (but RAN2 specifications do not mandate it as these fields are optional) when the UE is configured with EN-DC.”**

**Proposal 2: R2-2204411, R2-2204453, R2-2204504, R2-2204648, R2-2204649 can be noted.**

# Conclusion

**Proposal 1: to revise R2-2205513 adding the statement that “However, from RAN2 perspective, in practical deployment, it is expected that the network will configure p-MaxEUTRA and p-NR-FR1 fields (but RAN2 specifications do not mandate it as these fields are optional) when the UE is configured with EN-DC.”**

**Proposal 2: R2-2204411, R2-2204453, R2-2204504, R2-2204648, R2-2204649 can be noted.**

# Reference

1. R2-2204411 LS on configuration of p-MaxEUTRA and p-NR-FR1 (R5-217995; contact: Huawei) RAN5 LS in Rel-15 NR\_newRAT-Core To:RAN1, RAN2, RAN4
2. R2-2204453 Reply LS on configuration of p-MaxEUTRA and p-NR-FR1 (R1-2202769; contact: Huawei) RAN1 LS in Rel-15 NR\_newRAT-Core To:RAN5 Cc:RAN2, RAN4
3. R2-2204504 Reply LS on configuration of p-MaxEUTRA and p-NR-FR1 (R4-2206567; contact: Huawei) RAN4 LS in Rel-15 NR\_newRAT-Core To:RAN5 Cc:RAN1, RAN2
4. R2-2205513 Draft reply LS on configuration of p-MaxEUTRA and p-NR-FR1 Huawei, HiSilicon LS out Rel-15 NR\_newRAT-Core To:RAN5 Cc:RAN1, RAN4
5. R2-2204648 Discussion on configuration of p-MaxEUTRA and p-NR-FR1 ZTE Corporation, Sanechips discussion Rel-15 NR\_newRAT-Core R2-2202655
6. R2-2204649 [Draft] Reply LS on configuration of p-MaxEUTRA and p-NR-FR1 ZTE Corporation LS out Rel-15 NR\_newRAT-Core To:RAN5 Cc:RAN1, RAN4